

ABHIROOP AJITH

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EDUCATION

Worcester Polytechnic Institute

Doctor of Philosophy in Robotics, GPA: 4.0/4.0

Worcester, MA

August 2024 – Present

RESEARCH EXPERIENCE

Research Assistant

August 2024 - Present

ELPIS Lab, WPI, Worcester, MA

- Developing symbolic world models that learn discrete task abstractions from visual robot interaction data for long-horizon manipulation planning.
- Implemented learning-to-planning pipelines combining visual representation learning, symbol discovery, STRIPS-style model learning, and search-based task planning.

Research Intern – Pretraining (Robot Learning)

Summer 2026

Siemens Technology, Berkeley, CA

Self-Supervised Pretraining for Robot Execution Monitoring

- Developed predictive representation learning for robot video using approximately 25 hours of unlabeled multi-camera trajectories across 12 manipulation tasks and two robot embodiments.
- Built a label-efficient temporal adaptation pipeline for subtask recognition, failure detection, task-completion monitoring, and closed-loop recovery.
- Research resulted in the **RoboMonitor** manuscript currently under review and two additional Siemens patent submissions with publication numbers pending.

Research Intern – Advanced Robotics and AI

May 2022 – August 2024

Siemens, Berkeley, CA

ARM Visual-Tactile Robotic Surface Inspection: [Project Info](#) | [IROS 2023](#)

- Developed real-time algorithms for estimating surface normals from 3D point clouds of Boeing aircraft components.
- Implemented tactile-guided motion control using **GelSight** and a human-in-the-loop interface, achieving ± 1 mm defect localization accuracy and $5\times$ inspection efficiency.

ARM 3D Sewing for Robotic Jean Manufacturing: [CASE 2025](#)

- Engineered a trajectory-generation module from DXF files to automate robotic sewing of garment seams.
- Developed real-time fabric edge tracking using HED-based visual perception to improve sewing consistency.
- Integrated **MoveIt Servo** for visual servoing, achieving **3 mm** sewing tolerance.

Automated PPE Production in Shipping Containers:

- Implemented Vision Transformer-based segmentation for robotic pick-and-place of mask cases.
- Developed a constrained trajectory generator for automated mask sewing.

PUBLICATIONS

- [1] **Abhiroop Ajith** and Constantinos Chamzas. **STRIPS-WM: Learning Grounded Propositional STRIPS-style World Models from Images**. Conference on Robot Learning (CoRL), 2026.
- [2] **Abhiroop Ajith**^{*}, Gokul Narayanan^{*}, Jonathan Zornow, Carlos Calle, Auralis Herrero Lugo, Jose Luis Susa Rincon, Chengtao Wen, and Eugen Solowjow. **Robotic Automation in Apparel Manufacturing: A Novel Approach to Fabric Handling and Sewing**. IEEE International Conference on Automation Science and Engineering (CASE), 2025.
- [3] Jeel Chatrola^{*}, **Abhiroop Ajith**^{*}, Kevin Leahy, and Constantinos Chamzas. **Multi-layer Motion Planning with Kinodynamic and Spatio-Temporal Constraints**. ACM International Conference on Hybrid Systems: Computation and Control (HSCC), 2025.
- [4] Arpit Agarwal, **Abhiroop Ajith**, Chengtao Wen, Veniamin Stryzheus, Brian Miller, Matthew Chen, Micah K. Johnson, Jose Luis Susa Rincon, Justinian Rosca, and Wenzhen Yuan. **Robotic Defect Inspection with Visual and Tactile Perception for Large-Scale Components**. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2023.

^{*} Equal contribution.

UNDER REVIEW

- [1] **Abhiroop Ajith**, Gokul Narayanan, Kyle Coelho, Tingji Zhao, Yash Shahapurkar, Brian Zhu, Melih Erdogan, Ted Krubasik, Constantinos Chamzas, and Eugen Solowjow. **RoboMonitor: Label-Efficient Runtime Monitoring of Robot Task Execution via Predictive Representation Learning**. Under review, 2026.
- [2] **Abhiroop Ajith** and Constantinos Chamzas. **Learning Discrete Abstractions for Visual Rearrangement Tasks Using Vision-Guided Graph Coloring**. Under review, 2026.

PATENTS

- [1] Chengtao Wen, Justinian Rosca, Eugen Solowjow, Gokul Narayanan Sathya Narayanan, Jose Luis Susa Rincon, and **Abhiroop Ajith**. **Robotic Visual Tactile Surface Inspection System**. Siemens Corporation, WIPO (PCT), Publication No. WO2024181994A1, 2024.
- [2] Veniamin V. Stryzheus, Brian T. Miller, Matthew J. Chen, Micah K. Johnson, **Abhiroop Ajith**, Chengtao Wen, Jose Luis Susa Rincon, and Justinian Rosca. **Multimodal Inspection of Large-Scale Surfaces Using Vehicle-Borne Sensors (Method)**. Siemens Corporation and Boeing Co., U.S. Publication No. US20250388339A1, 2025.
- [3] Veniamin V. Stryzheus, Veniamin Tereshchuk, Arpit Agarwal, Wenzhen Yuan, Micah K. Johnson, **Abhiroop Ajith**, Chengtao Wen, and Justinian Rosca. **Multimodal Inspection of Large-Scale Surfaces Using Vehicle-Borne Sensors (System)**. Siemens Corporation, Boeing Co., and Carnegie Mellon University, U.S. Publication No. US20250388337A1, 2025.
- [4] **Two additional patent applications submitted through Siemens Corporation**. Publication numbers pending, 2026.

AWARDS & TRAVEL GRANTS

CoRL Student Travel Award	2026
ACM SIGBED Student Travel Award — \$2,000	2025
Dr. Glenn Yee Graduate Student Travel Award , Worcester Polytechnic Institute — \$450	2025

TEACHING EXPERIENCE

Teaching Assistant <i>Worcester Polytechnic Institute</i> • RBE 577: Machine Learning for Robotics	Spring 2025 <i>Worcester, MA</i>
Teaching Assistant <i>Worcester Polytechnic Institute</i> • RBE 2001: Unified Robotics I • RBE 2002: Unified Robotics II	Fall 2024 <i>Worcester, MA</i>

REVIEWING SERVICE

- IEEE Robotics and Automation Letters (RA-L)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)